
PROLONGED RETENTION OF LIFE BY INFANTS STILL-BORN.

CASES

READ BEFORE THE WASHINGTON OBSTETRICAL AND
GYNECOLOGICAL SOCIETY.

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WASHINGTON, D. C.

Judd & Detweiler, Printers.

CASE 1. December 5, 1870, Mrs. C., called at 2 A. M. to see woman twenty years old, who was flooding away; when I reached the house nurse said madam was delivered of dead twins at $12\frac{1}{2}$ exactly. I found woman in dying condition, and she expired in few moments. Before leaving I asked where the babies were, and nurse said: "Oh, they were both born dead, and so I put them in a bucket, and out in the shed, because they smelt so bad; they had been dead a week." I brought the bucket in the house and examined the babies, one was quite dead, the other feebly respiring; I used every effort without avail to restore the child, although at first I hoped I might succeed. Now, this child was in the bucket for probably three hours, and if the respiration had been even noticeable, the nurse would have wrapped the child in blankets, and made some effort to keep it breathing. It may not be out of place to state, one of the umbilical cords measured thirty-nine inches in length, and was very small, while the other was scarcely six inches.

CASE 2. October 12, 1873, Mrs. H., aged 28 years, first pregnancy, after eight hours hard labor, delivered male child, weighing ten pounds, great haemorrhage, which followed delivery, so engaged my attention that the child, which I thought dead, remained unattended in a chair without covering for at least eighteen minutes. After fixing the patient as well as I could, I turned to the infant, which appeared quite cold, drew the tongue forward and cleared out the fauces, and pressed upon the chest, used cold and hot water for some minutes alternating, when, to my astonishment, a slight inspiration was made. I could detect no heart pulsation at all. I continued these active measures for three or four mintues longer, when a second respiration was made, but feebler than the first. I repeatedly made efforts to procure a third respiration, but could not succeed. Now, I believe if this child had been earlier attended, it might have been revived.

CASE 3. March 15, 1881, Miss —— was sent for by nurse to relieve woman who she said had been in labor for two days. I found head pressing the perineum, but after waiting half an hour discovered that no progress was being made, and as the pains were feeble, and patient in an exhausted condition, thought it best to use forceps, and without help, save from this ignorant nurse and without anaesthetics, (it being three miles in the country, and not therefore procurable,) I succeeded in delivering the woman of a female child about eight pounds. The child was pale and bloodless, the cord had two knots about one inch apart, which during the passage of the child may have been tightened to such an extent as to impede the flow of blood. I tied the cord at once, removed the child, and endeavored to restore by artificial respiration. After fifteen minutes by constant and careful methods, succeeded, and the next day child seemed well except when handled; she seemed sore over the chest, doubtless caused by my efforts day before in pressing upon chest-walls with too much force.

CASE 4. Jan. 5, 1883, Mrs. G. called to assist a physician in case of breech presentation—first labor. Patient short in stature and delicate. She had been in hard labor for six hours, and the doctor informed me had made no progress in that time, nor had she felt the movements of the child for some hours. Æther was given, and after some delay in delivering the body of the child, which was pale and bloodless from long pressure, a more vexatious delay occurred in delivering the head, but by getting my fingers into the child's mouth I finally succeeded without seriously injuring the mother's soft parts. The umbilical cord was flaccid and pale, and I did not stop to tie, believing the child to be dead, and turned my attention to the slight hemorrhage which was taking place, and to the delivery of the placenta. After making the patient as comfortable as I could, which occupied twenty-five minutes, I walked into the next room to look at the child. There was no fire in the room, and the

infant lay upon a sofa partially covered with a shawl, apparently dead and pulseless. The surface of the skin was cool; with a pair of sharp-pointed scissors I held in my hand, I pricked the calf of the child's leg and was astonished to see the infant make a slight movement of the limb. I called the doctor and repeated the pricking, and each time the child seemed to show signs of life. We at once proceeded to employ measures calculated to promote respiration, viz., alternating pressure upon chest with raising and lowering of arms, and blowing through a napkin into the child's lungs, first drawing out the tongue as far as possible. Our efforts were rewarded by success, and that the child lives and moves, and has its being, I verily believe, is due solely to said efforts. Since writing the above, I have recently been associated with a physician in a case of labor requiring manual interference in which the child was apparently dead and was resuscitated by the doctor only after the most persistent efforts of nearly an hour's duration. The long period during which life may under certain circumstances be retained by the infant who has never breathed, is full of interest to the physiologist, the accoucheur, and the medical jurist. The experiments of Legallois show that, in the mammalia the foetus which has not breathed can resist death from submersion much longer than the fetus in which respiration has been carried on. Puppies and kittens immediately after birth, may be kept under water for twenty-eight minutes with impunity, when five days old they perish after sixteen minutes submersion, and when fifteen days old they die as rapidly as other warm-blooded animals of any age from deprivation of air. The human still-born foetus can probably live longer without respiration than any other mammalian foetus.

From different sources the following cases are collected, and they are very striking and very suggestive to the practical accoucheur :

CASE I. A woman aged 25, who had tried to conceal her pregnancy, was delivered when seated on a tub. The in-

fant, born without any signs of life, was buried in a sand-pit, and after remaining there for half an hour, was removed and lived.

This case is described by Dr. Weese; in 1845, in the *Gazette Hebdomadairn*.

CASE II. T. P., a servant, aged 23, was delivered in a stable, when leaning against the wall, alone and in a state of unconsciousness, about half-past four A. M., on the 16th of October, 1850. When she came to herself, she found the infant on the ground, having a spade lying upon it, with its cutting-edge turned to the body. She took the infant, which was perfectly cold, believing it to be dead, and with the placenta attached, wrapped it up in her apron and buried it in the garden. Suspicions arose that she had been confined; she confessed, and at half-past nine the infant was dug up from the depth of thirty centimeters. It was found lying on its face, with the placenta under the abdomen. Though cold, apparently dead, and pulseless, the cord was tied. For two hours a surgeon used means to reanimate it, when at last it began to breathe feebly, gradual signs of life became more evident, and it cried. Some slight wounds were observed on its body; wounds in the neck, which did not bleed at first, bled when the infant was restored. It took the breast greedily. On the 17th and 18th the wounds suppurated, and on the 19th it died of convulsions. The physicians entrusted with the judicial autopsy reported that it had been inhumed before it had breathed, and that it had not breathed till after it was exhumed, and that the statement of the mother was possibly true. She was therefore acquitted of the charge of infanticide, but was found guilty of concealment of pregnancy. This case was reported by Dr. Maschka.

CASE III. In 1851 a young woman was tried by the tribunals of Berlin, who had buried her new-born male infant, believing it to be dead. After an hour the infant was disinterred and recalled to life.

CASE IV. A girl gave birth about noon, in a private house, to an infant, who gave no signs of life. For an hour different unsuccessful attempts were made to animate it. The skin became blue, and gradually warmth left it. It was considered dead, and in three hours it was removed to a cold room. (This occurred in January, and the weather was very cold.) Towards evening it was closed up in a coffin. During the night the windows of the room remained open. At 11 A. M. on the following day—that is, twenty-three hours after the birth—Dr. Maschka, being accidentally in the house, was asked to look at the body. It was perfectly cold and blue; the eyes and mouth were shut; the joints and the extremities were flexible; there was neither rigidity nor cadaveric discoloration. Astonished at this latter circumstance, but not really doubting that the death of the infant was real, Dr. Maschka placed the stethoscope upon the region of the heart, when, to his amazement, he distinctly heard the sounds of the heart; they were feeble, and at long intervals. It was impossible to appreciate the impulse of the heart against the walls of the chest, or to perceive any movement in the corresponding intercostal space. Attempts at resuscitation were made, but without any effect. At the autopsy on the following day cadaveric discolorations and rigidity were present; the lungs were of a deep red, and contained no air; they were heavier than water; there was blood in the left but none in the right side of the heart. It must be admitted, provided the observation of the reporter be correct, that this infant lived twenty-three hours after birth, and never breathed.

CASE V is taken from page 214, Braithwait's Retrospect, Parts 31 and 32. February 20, 1850, a woman was tried for attempting infanticide; she had buried her infant, but it was dug up, breathed, and lived. The following are the facts: Marie and Renée lived with their father at Vernantes, in the arrondissement of Bruegé. On the 16th day of May, Marie was alone in the house with her father. About half

past six p. m. Renée came home, found Marie in a swoon, and called the neighbors to her assistance. Marie soon regained her consciousness. One of the female neighbors, having observed numerous spots of blood, asked Marie if she had been confined. She replied: "No, it is not yet time." Her father, however, having observed the earth disturbed in a place in the garden, asked her to explain it, when she replied: "I have been confined; but as my child was still-born, I buried it in the garden." The child was then disinterred. It was found five centimetres (two inches) below the surface, with its face downwards, and with the placenta attached. Means were used to restore the infant, and it was ere long recalled to life. It was calculated that the infant had been three-quarters of an hour under ground. The accused was acquitted.

Bedford's *Obstet.*, page 371: "Of course we know the faculty of resisting asphyxia, that is of living without breathing is very much greater in the new-born infant than in the adult, or in infants who have once breathed, so that if a child should not breathe for an hour, or even much longer after birth, it should not be abandoned as dead, and, therefore, considered beyond remedy."

Cases are recorded in which resuscitation has been accomplished by some of the means alluded to even after the asphyxia had continued for a long time. In an interesting article on the "Resuscitation of Children Born Still," by W. C. Rogers, M. D., of Green Island, recently deceased, published in the American Medical Monthly for February, 1860, there is a record collected from various sources of twenty-four still-born infants resuscitated by artificial respiration, by both hot and cold, by frictions and by Marshall Hall's method, applied singly or jointly, from 10 to 90 minutes, the average period intervening between birth and establishment of respiration being 35 minutes 30 seconds. In this article, also, allusion is made to the remarkable case reported by J. Foster Jenkins, M. D., of Yonkers, New York, in which the funis was pulseless for twenty-five minutes before delivery, and

no attempt was made at respiration for thirty minutes after birth ; more than two hours constant attention was necessary to preserve the child's life. Bedford further says : "A newly-born infant, affected with asphyxia, should not be regarded as dead because its heart has ceased to beat ; for it has been demonstrated by Brachet, of Lyons, Josart, and others, that life may be restored after the pulsations of the heart had ceased for more than five minutes." In what direct conflict is this fact with the opinion very emphatically expressed some years since by Sir B. Brodin, who wrote : " If the action of the heart, by which the circulation is maintained, should cease, as a consequence of the suspension of respiration, it can never be restored. This I positively assert, after having made it the subject of a very careful investigation."

This ability in the new-born child to resist asphyxia explains why in cases of death of the mother it may be extracted alive from the uterus, through the Cæsarean process, even after the parent has been dead for a longer period than half an hour.

Dr. Brown-Sequard has shown that in these instances of post-mortem Cæsarean section, if the mother die when the body is quite warm, the life of the child is in more danger than when the body has become somewhat cold previous to dissolution. It would appear then, from these experiments, that asphyxiated infants should not be kept near a fire, for the colder the temperature of the air the longer can they resist asphyxia.

In my case of breech presentation it would probably have been better to have ligated the cord before the complete birth of the child, for in these cases of breech and foot presentation often the child dies from haemorrhage into the placenta, arising from the umbilical vein being much exposed to pressure, by virtue of its superficial and unprotected position in the cord, which, together with the tenuity of its tunics, render it very liable to have its current obliterated ; whereas, the tunics of the umbilical arteries are

firmer and they themselves less exposed; thus they are, in a measure, protected from the consequences of slight pressure. Therefore, the flow of arterial blood through the vein may become obliterated, whilst the venous blood continues to flow along the arteries from the child into the placenta without there being any counterbalancing stream; hence the chances of saving the child's life are not, to say the least, diminished by ligature of the cord, even if pulsating.

As I stated in the first pages of my paper, these cases are of great interest to the medical jurist, for instance, in disputed cases of survivorship during parturition. If mother and child both die in child-bed without witnesses, the presumption is (according to Tidy, Legal Medicine, page 34, Vol. II) that the mother survived the child. "For, 1st, there is a *prima-faciæ* probability of the child being still-born, and that a woman in child-bed, without attention or attendance, will be unable to render her child the assistance necessary for its preservation; 2d, a large child, or external marks of a difficult labour, or the absence of the signs of respiration, would suggest the death of the child as occurring before that of the mother. Thus, from both points of view, the presumption of survivorship in those rare cases where mother and child both die is in favor of the mother. We agree with most medical jurists, that those who assert that the child survived the mother should be required to adduce definite evidence of their contention; at the same time it must be remembered that although the child may die from cold, or from its being of unusual size, or from protracted labour, or from labor complicated with convulsions, or from pressure on the umbilical cord, or from partial detachment of the placenta, and other causes, nevertheless that the mother runs the risk (and that risk a very dangerous risk) of haemorrhage." Again, it is quite conceivable that a mother might give birth to a child, and herself tie the cord, and then die of syncope from the exhaustion consequent on the effort, whereas the child would be temporarily safe.

In a case decided by the Imperial Chambers at Wetzlar

in favor of the child being the survivor, it was urged that the mother sank exhausted by the pains of labor, and as a result that the child died for lack of nourishment.

Thomas Stewart Trail, of Edinburgh, in his work on Medical Jurisprudence says of the presumption of survivorship: "When a mother and her new-born infant are found dead, important civil rights depend on the question, which lived the longest; as the husband's right to be tenant to the courtesy, or the descent of property derived from the mother. The law of England in such cases admits such slender proofs of life in the *fœtus* as would not be received elsewhere, and leaves much to the evidence of a medical witness. Elsewhere the child must either cry or look around to constitute a quick birth, but in England a quiver of the lips has been received as a proof of life, in defiance of physiology. In Scotland the viability of a child is determined by its crying, in France by its respiration; but in England, any tremulous motion of its muscles, however trifling, has been decided to constitute life. In other countries such slight movements would never be received as anything but the remains of irritability."

In the case of *Fisch versus Palmer*, 1800, published in Edinburgh, 1841, by Trail, "The viability of the child is very important, and is recognized by the perfection of its organs, the position of the mesial line, the appearance of its nails and skin, the cry of the infant, and its capability of sucking." This is a subject to be investigated, because in some instances, as I said before, if a child be born not viable, it may affect the succession of property when the mother dies in child-bed, and it may also bear on certain cases of alleged infanticide.

Dr. Virchow, in the transactions of the Berlin Obstetrical Society, proposed a sign to ascertain whether a child has been born alive; or, rather, whether it has lived more than two days. The test is to be found in the absence or presence of uric acid in the kidneys. Virchow wished to show that the presence of uric acid in the kidney (at once to be detected

by the naked eye) is a conclusive proof that the child found dead has been born alive. The ancient anatomists remarked a red or yellowish substance coating the mammillæ of the kidneys of infants, and which modern science has found to be uric acid and analogous to the calculi sometimes found in the bladder of children. Schlossberger treats of it under the name of "*infractum acidi urici*," and it is easily discovered by making a transverse section of the kidney when a considerable number of yellowish brown and sometimes light yellow rays of this substance are seen ramifying from the tubular and sometimes from the cortical substance to the mammillæ. Under the microscope we make out sometimes solid cylindrical particles of a yellowish brown color, though more frequently these cylinders seem to be not yet formed, or to be broken up into molecules of a darker color, round or angular, and not unlike the crystals of urate of ammonia. A greater quantity is obtained by pressure. The conclusions of Virchow—1st, That the deposit is never found in children who have been born dead, or who have died within forty-eight hours after birth; 2d, That the deposit is not found, or does not occur, until about forty-eight hours after birth; 3d, That the deposit is not generally found later than the twentieth day after birth. There are, however, exceptions to these rules, for the deposit was in one case found on the 29th day after birth; and Virchow had not found it in an infant dead on the 10th day, nor in another on the 13th, nor in a third on the 6th day; these, however, may be the consequence of disease. It is to be hoped recent experiments will determine the value of Virchow's views.

It is of the first importance that the medical jurist should distinguish accurately between post-mortem ecchymoses and bruises, the result of violence inflicted during life. Of course the points of resemblance between these are often so great that mistakes are not only possible, but have no doubt frequently been made. In Tidy's Legal Medicine, page 66, appears this table, showing some of the points of difference be-

tween a vital ecchymosis (bruise) and a post-mortem ecchymosis (lividity), which it may not be out of place to glance at:

BRUISE PRODUCED DURING LIFE.

1. *Anatomical Seat.*—Effusion of blood from small ruptured vessels into the true skin and the surrounding cellular or arrolar tissue (sub-cutaneous tissue.)

2. *Position.*—The seat of the injury.

3. *Extent.*—More or less limited to the parts injured.

4. *Changes by Time.*—The dark purple bruise, after 18 to 20 hours, or sometimes as late as 2 or 3 days, becomes highly tinted at the edges, and of a more or less violet color. After this the color of the bruise passes through various shades of green, yellow, and lemon, the center, however, always being the darkest part. During these changes, which are dependent on the oxidation of the effused blood, the spot enlarges. The changes are complete in times varying from a few days to some weeks.

While it appears by this table that, as a rule, the distinctions between a bruise produced during life and a post-mortem ecchymosis are fairly well defined, great caution in conducting these inquiries should be observed.

Again, the question how far the cause of death may be determined after the lapse of a considerable interval needs consideration. It is certain that the natural causes that show themselves only by minute pathological conditions, will in most cases disappear after prolonged burial, possibly the marks of strangulation in infants as proof of infanticide may offer an exception, as the lungs themselves ordinarily resist decomposition for a long time, and putrefaction does not materially interfere with their examination. Still, although the lungs resist decomposition, the larynx and trachea are

POST-MORTEM ECCHYMOSIS.

1. *Anat. Seat.*—Congested capillaries in the rete mucosum and vascular tissue above the true skin.

2. *Position.*—Such dependent parts of the body (according to how it may be placed) as are not subjected to pressure.

3. *Extent.*—At first the stain appears in isolated patches, rapidly running together, more or less, over the whole of the dependent portions, except those parts subjected to pressure of the surface on which the body rests.

4. *Changes of Time.*—The color remains tolerably constant until putrefaction sets in. No zones of color form round the edge, such as occur in a life bruise.

first of the internal parts of the body which show putrefactive changes, probably because they are the most ready of access to air. Tidy says, page 88 Legal Medicine:

"It is to be remembered that in from three to five days after death in summer, and from six to eight in winter, the larynx and top of the mucous membrane of the trachea assumes a brownish red or olive green color, and care must be taken not to confound these discolorations (for the diagnosis is not always easy) with the results of laryngitis or of death by drowning or suffocation. The hydrostatic test of Tidy, page 264, is: 1st, Remove lungs and heart entire, securing all the large vessels to prevent loss of blood; note if they float when placed in water *en masse*, using for this purpose a large vessel filled, by preference, with rain water; 2d, Test each lung separately in a similar manner; 3d, Cut each lung into ten or twelve pieces, and note whether the separate portions sink or float; 4th, Each piece of lung is now to be placed on the floor and covered over with a piece of board, and pressure applied by a person standing on the board for a few minutes. The several pieces, after this treatment, are again to be tested whether they sink or float. If the lungs float by all four tests, as described, there is strong presumptive evidence in favor of respiration, and conversely, if they sink, there is strong presumptive evidence in favor of non-respiration."

There is always a danger in a post-mortem, especially after death, by asphyxia, of the blood escaping from the heart when the head is opened before the thorax.

It is always recommended where death by asphyxia is suspected, to examine the chest first. In such case the pericardium should be laid open and the heart examined *in situ*. The right cavities should then be exposed, by which means good and undoubted evidence of the actual state of the right heart will be secured. I should say here that in the case of asphyxiated infants, Tidy recommends that the abdomen should be opened before the thorax in order that the position of the diaphragm may be determined, a matter

of importance in deciding whether the infant has or has not breathed.

The physiological question remains for discussion, viz: How can there be circulation in the infant without respiration, and, therefore, without the production of arterial blood?

The movements of the heart must gradually become very slow, (a kind of human hybernation,) for, according to the experiments of M. Bouchuts, the marmot's heart beat ranging from 80 to 90 per minute, under ordinary conditions, sink during hybernation to 8 or 9. The cases recorded of profound sleep or trance show how slow and feeble the heart's action consistent with life may become. It appears to me, Mr. President, this condition of passive life can only exist when assimilation is at a minimum, and when the oxygen of the maternal blood is consumed very slowly. I should think the maternal blood must, in such cases, be sufficient to maintain life.



